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MAILED 02 JUN 1999

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I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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Dated 4 JUN 1999

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

£25

1. Your reference

10 AUG 1998 Jg- 2371

THE PATENT OFFICE L 10 AUG 1998 LONDON

2. Patent application number
(The Patent Office will fill in this part) 9817399.0

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

WEB DYNAMICS LTD,
BATCHWORTH LOCK HOUSE,
99 CHURCH STREET,
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UNITED KINGDOM. 7389SU/ROO1 DJ
UNITED KINGDOM.

Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

EMBOSS PATTERN INTERACTION IN THERMAL BONDING

5. Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

GRAHAM JONES & COMPANY,
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Patents ADP number *(if you know it)* 2097001 4014502006

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

YES

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	4
Claim(s)	
Abstract	
Drawing(s)	1+1

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	2
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature Graham Jones & Company Date 10/8/98

12. Name and daytime telephone number of person to contact in the United Kingdom Mr. G.H. JONES 0181 858 4039

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.*

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e) *Once you have filled in the form you must remember to sign and date it.*

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EMBOSS PATTERN INTERACTION IN THERMAL BONDING

This invention relates to emboss pattern interaction in thermal bonding.

In non-woven technology, fibres or filaments are frequently bonded using heat and pressure. Heat and pressure may be applied evenly across the whole are of the fabric, or it may be applied intermittently so that only discrete areas of fabric are bonded. Discrete area bonding confers a more textile character to the material compared to total area bonding. The properties of the material, its appearance, drape, softness and strength are all dependent on the choice of the bonding pattern used. Discrete area bonding is most frequently achieved using a calender system comprising two heated rolls. One roll is smooth and the other roll carries the embossing pattern. The web of fibres or filaments are bonded together as they pass through a nip between the two rolls. This method of bonding is well known and it is the most frequently used method in spunbonding non-woven technology, whereby continuous filaments are formed by extruding thermoplastic polymers, for example polypropylene, forming them into a web, and bonding in one continuous process.

In an extension of the above mentioned process, a spunbonded web may be fed through a thermal bonding unit along with another layer, for example a film or a microfibre layer, and be simultaneously bonded to it. For thermal boding to occur to any useful extent between the textile fibres or filaments and additional membranes, the materials should be compatible, that is they should be related in chemical composition and melting points.

There are various restrictions inherent in in-line lamination of this type. The range of processing speeds during in-line lamination is limited by the speed range of the filament extrusion process. The speed range of the extrusion process may limit the heat transfer, and hence the bonding, during lamination at the calender nip. It is also difficult to process multiple layers using this technique. For example, the production of a film sandwiched between two fabric layers requires two processes, the production of a two component layer (fabric plus membrane) followed by the addition of the second fabric layer in a second lamination step.

The development of off-line thermal lamination obviates many of the above mentioned difficulties. Fabrics, films, microfibre membranes, nets and other structures can be combined in ways that would be

difficult or impossible in-line with a fibre or filament forming process such as spunbonding.

We have discovered that an important factor in off-line thermal boding is the interaction of the boding pattern of the lamination process with the bonding pattern that may already be present in any of the components prior to lamination. It is particularly disadvantageous to thermally laminate using a bonding pattern which is the same as, or very similar to, the bonding pattern of any other component layers. It has been observed that the emboss patterns of the laminator and the components form Moiré patterns due to the juxtaposition of the two emboss patterns. When the bonding patterns are the same, or very similar, the Moiré pattern comprises relatively large areas in which the emboss points are effectively in-phase or out of phase with each other. These relatively large areas may be from 25mm^2 upwards, and typically about 400mm^2. With light weight components, typically less than 50g/m^2, this does not significantly affect the lamination. However, the visual effect is not attractive and the laminate may appear uneven or wrinkled. At component weights above approximately 50g/m^2, an additional effect has been observed. In areas where the emboss points of the laminator and the component are in phase, the

thickness of the component ensures that the embossing points of the laminator are unable to provide sufficient pressure for lamination to occur. The finished laminate may exhibit areas that are well laminated where the emboss points are out of phase, and areas that are relatively or completely unlaminated, where the emboss points are in phase.

It is an aim of the present invention to obviate or reduce the above mentioned problems.

In accordance with the present invention, it has been found that it is advantageous to thermally laminate using a lamination pattern that is significantly different from that of the components.

Advantageously, the patterns should not be aligned along the same, or a similar, axis.

Patterns that are nominally the same can be sufficiently differentiated, for the purposes of the present invention, by turning the axis of one of the components so that groups of emboss points are not coincident.

The invention is illustrated by way of example with reference to the accompanying drawing showing 19% diamond boss.